A Study Of Selected Variables Associated With Multidimensional Health Locus of Control Among Cardiovascular Disease And End-Stage Renal Disease Patients

by

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Table of Contents

List of Tables

CHAPTER I

INTRODUCTION

Persons with chronic illness frequently experience loss of control over important aspects of daily living as they are confronted with recurrent hospitalizations, life-long therapy, and a rigid medical regimen. While relinquishing many of their usual societal roles, they are required to assume management of their therapeutic regimen. Rather than accept this responsibility, a significant proportion of chronically ill persons choose to ignore efforts by health professionals to increase self-sufficiency and improve the quality of life.

As a person's belief in locus of control may affect health outcomes, nurses need to have information that identifies whether patients believe control of health lies in themselves, health care providers, or fate. From this information, nurses could plan health programs. Recent research has suggested that altering health locus of control beliefs of individuals in health education programs may be beneficial (Green, Levine & Deeds, 1975). On the other hand, tailoring health programs to individual health locus of control beliefs has produced positive health outcomes (Best, 1975). Presently, it is not known which particular strategy is more feasible in the design of successful nursing interventions.

Locus of control has been recognized as a major variable associated with behavioral outcomes in health. Yet, little research has dealt with the effect of chronic illness on locus of control beliefs. Even fewer investigations have identified the influence of individual characteristics which contribute to varied beliefs in control of health. The present research focused on variations in health locus of control beliefs in relation to selected demographic and illness-related characteristics among cardiovascular disease and end-stage renal disease patients.

Review of the Literature

The review of the literature explores four areas related to locus of control. First, locus of control is conceptually and operationally defined within the context of health. Secondly, the factors associated with locus of control beliefs are presented. Third, the relationships between chronic illness and locus of control beliefs are explored. Finally, characteristics of persons with cardiovascular disease and end-stage renal disease which may be related to locus of control beliefs are presented.

Locus of Control: Concept and Measurement

Locus of control developed from social learning theory (Rotter, 1954; Rotter, 1966; Rotter, Chance & Phares, 1972). According to this theory, prediction of behavior in any

situation is determined by the individual's expectancy that behavior will lead to reinforcement and by the value of the reinforcement to the individual. Because of varied histories of reinforcement, individuals differ in attributing reinforcements to their own actions. In effect, reinforcements serve to strengthen an expectancy that a behavior will be followed by a particular reinforcement in the future. As a generalized expectancy, locus of control is one of many factors in a complex formula for predicting behavior.

Since publication of reviews by Rotter (1966) and Lefcourt (1966) concerning development of the concept of locus of control, it is estimated that at least 1,000 studies have appeared in the literature (Phares, 1978). A review of the major studies dealing with the concept of locus of control is instructive in appreciating its relationship to health.

Recent work with locus of control stems from the monograph written by Rotter in 1966. In this monograph, utilizing social learning theory, Rotter (1966) first outlined and defined the concept of locus of control. In essence, Rotter (1966) conceptualized locus of control as a personality construct in which individuals could be ordered along a unidimensional continuum, from internal to external. According to Rotter (1966):

> When a reinforcement is perceived by the subject as following some action of his own but not being entirely contingent upon his action, then, in our culture, it is typically perceived as the result of luck, chance, fate, as under the control of powerful others, or as unpredictable because of the great complexity of the forces surrounding him. When the event is interpreted in this way by an individual, we have labeled this a belief in external control. If the person perceives that the event is contingent upon his own behavior or his own relatively permanent characteristics, we have termed this a belief in internal control. (p. 1)

In other words, internals tend to believe that they are the agents who determine the consequences of their behavior. Externals, on the other hand, tend to believe that forces outside of their control determine the consequences of their behavior.

Based on the contributions of Phares, James, Liverant, Crowne, and Seeman, Rotter (1966) devised the Internal-External (I-E) Scale. This unidimensional scale was created to measure beliefs about the nature of the world and expectations of how reinforcement is controlled. According to Rotter (1975) the scale is broad in scope, not one that would be highly predictive of behavior in a specific situation.

As research on locus of control accumulated, extensions of Rotter's original conceptualization occurred. First, the conceptualization of locus of control was defined as multi-dimensional. Further, Rotter (1966) emphasized the importance of specific expectancies in attempting to preduct behavior in specific situations. According to Rotter (1975), a specific expectancy results in greater prediction for the specific area of interest. Thus, both refinements in conceptualization facilitate understanding of present locus of control studies in the specific area of health.

Factor analysis led to identification of two to four separate dimensions of the construct. For example, Viney (1974) identified a personal responsibility factor and one of social responsibility. Collins (1974) reported four factors within the concept of externality: belief in an unjust world, belief in a difficult world, belief in chance, and a belief in a politically unresponsive world. As a result, multidimensionality of the concept of locus of control was recognized.

Of particular importance for this study is the work of Levenson (1974) who contended that there were two distinctions within the concept of externality. Specifically, Levenson hypothesized that individuals who believe in chance deciding their fate differ from individuals who believe powerful others

control their fate. As a result, Levenson (1974) adapted Rotter's I-E scale into a three-dimensional locus of control scale.

Levenson's (1974) newly devised tool consisted of three separate scales: Internal, Powerful Others, and Chance (I,P,C.). These scales utilized a 6-point Likert-type format and consisted of eight items per scale. In an investigation of 96 healthy male and female adults, Levenson (1974) reported significant differences for males on Powerful Others and Chance scales, with males scoring significantly higher than females on the Powerful Others scale. Further, Levenson (1974) reported moderate correlations between the Powerful Others and Chance scales. These findings suggested that a unidimensional scale was inappropriate for measuring generalized expectancies.

A second major departure from the original conceptualization of locus of control concerned specificity. Accordingly, Wallston, Wallston, Kaplan and Maides (1976) capitalized on the distinction between generalized and specific expectancies which was inferred in social learning theory. In making predictions in specific situations, it is believed that more precision is gained when the expectancy is restricted to the area of interest. As a result, Wallston, Wallston, Kaplan and Maides (1976) conceptualized and operationalized locus of control in the specific area of health.

Initially, Wallston, Wallston, Kaplan and Maides (1976) developed a unidimensional Health Locus of Control (HLC) scale to measure locus of control beliefs in the specific area of health. This newly devised scale consisted of 11 items and correlated with Rotter's I-E scale. Two investigations of the functional utility of the scale were reported by Wallston et al. (1976).

In the first investigation with the HLC scale, Wallston et al. (1976) reported a marginally significant interaction between health value and HLC classification among 88 volunteer college students in a hypertensive clinic. Internals, as classified by the HLC scale, who highly valued health, chose more pamphlets about hypertension after exposure to a message explaining the dangers of hypertension. Based on this finding, Wallston et al. (1976) suggested that a generalized expectancy measure such as Rotter's I-E scale would not have distinguished internals and externals in health information-seeking.

In the second study comparing the utility of the HLC scale with Rotter's I-E scale, Wallston et al. (1976) randomly assigned 34 overweight females to two different weight reduction treatment groups congruent with internal-external orientation. These researchers reported a significant interaction between HLC orientation and type of program. Using the HLC scale, Wallston

and colleagues found externals lost more weight in the group program (externally-oriented treatment) than in the self-directed program. Using the I-E scale, these investigators reported results in the opposite direction.

Impetus to revise the original unidimensional health locus of control scale into a multidimensional instrument followed from the work of Levenson (1974). Also, Wallston and Wallston (1978) obtained repeatedly low alpha reliabilities for the HLC scale which led them to investigate the construct for multiple dimensions. In creating a multidimensional scale Wallston, Wallston and DeVellis (1978) separated the external scale into two scales, Powerful Others and Chance; reworded items in the personal mode at an 8th grade reading level; and created equivalent forms of the scale. Initial testing of the newly-devised scale was performed by administering the instrument to 125 persons over the age of 16 at a metropolitan airport.

In analyzing the results of their investigation of the scale, Wallston, Wallston and DeVellis (1978) found several significant correlations. The Internal HLC scale and the Chance HLC scale were negatively correlated, while the Chance HLC scale and Powerful Others HLC scale were positively correlated. Internal HLC scale and Powerful Others HLC scale

were reported to show no significant relationship. Significant intercorrelations were found between the newly devised scale and Levenson's (1974) I.P.C. scales in the expected directions. Health status correlated positively with the Internal HLC scale and negatively with the Chance HLC scale, but there was no relationship with the Powerful Others HLC scale.

Based on initial findings, Wallston, Wallston and DeVellis (1978) presented suggestions for use of the Multidimensional Health Locus of Control (MHLC) scale in future research. According to these investigators, the following factors should be considered before using the scales: the population to be studied, the time constraints in administering the scales, the type of health behaviors of interest, and the design of the study. Because the MHLC scale was constructed relatively recently, the role of health locus of control in predicting health behavior has not been explicated. However, it is believed to be modified by other important factors. In the words of Wallston, Wallston and DeVellis (1978):

> Only in interaction with one, or preferably more, of a multitude of contributing factors . . . (perceived severity and susceptibility; health motivation; social supports; previous behavior; attitudes toward health professionals; perceived costs and benefits of specific actions; demographic

> factors such as race and social class; and, most importantly, the value of health as a reinforcement) . . . will beliefs in the locus of control of health play a significant role in explanation of health behavior. (p. 168)

In other words, scores from the MHLC scale alone, without consideration of other factors, do not adquately explain health beliefs and behavior.

At the same time, but separate from the work of Wallston et al. (1978), further research emerged to contribute to an understanding of locus of control in health. Based on Collin's (1974) factor analysis, Lau and Ware (1981) developed a multidimensional health locus of control scale consisting of three dimensions of externality. The three measures of externality included: Chance Health Outcomes, General Health Threat, and Provider Control. In a study of psychology students, Lau and Ware (1981) found significant intercorrelations between Chance Health Outcomes and General Threat to Health. In addition, these investigators reported no significant relationship between Chance Health Outcomes and Provider Control Over Health, scales that resemble those of Chance Health and Powerful Others Health on the Wallston scale.

The work of Lau and Ware (1981) demonstrates that

conceptualization and operationalization of health locus of control is not complete. This newly devised scale needs to be tested with chronically ill persons to determine its usefulness. At present, it is evident that inquiry into individual expectancies for control over health is in the early stages of development.

Factors Associated with Locus of Control Beliefs

According to social learning theory, locus of control as a variable is influenced by many factors in the individual's experience and environment. To date there has been limited and inconclusive research identifying these factors. The results have been mainly correlational in nature. However, demographic and illness-related factors associated with beliefs regarding locus of control have been reported in the literature. The review which follows will focus on these factors.

Age

The research relating age to locus of control beliefs is inconclusive. Some investigators suggest that locus of control orientation changes with age. Phares (1976) contended that the elderly return to a more helpless state and exhibit more external beliefs. Studies by Krantz and Stone (1978); Hunter, Linn, Harris and Pratt (1980); and Schultz (1976) supported the hypothesis that externality results as age

increases. Other researchers report contrasting findings. Penk (1969) in a cross-sectional study found internality increasing in age groups by decades until age fifty. Rotella and Bunker (1978) reported high internality among healthy males averaging 67 years of age.

Gender

Originally, Rotter (1966) reported minimal differences between male and female college students on locus of control beliefs. Feather (1967, 1968) reported females were more likely to be external. McGinnies, Nordholm, Ward, and Bhanthumnavic (1974) also found greater externality among women. Wallston, Wallston, Kaplan and Maides (1976) reported no significant differences regarding health locus of control beliefs between males and females. Joe (1971) and Phares (1976) suggested that cultural roles and a shift in cultural expectations among men and women in the last decade may account for the varied results in studies of sex differences and locus of control beliefs.

Ethnicity

Studies have explored the relationship between ethnicity and locus of control orientation. The interaction of ethnicity and social class affects locus of control beliefs according to Lefcourt (1966). Higher external scores have been reported

for blacks and other minority groups than for a comparable group of whites (Battle & Rotter, 1963; Lefcourt & Ladwig, 1965). Tin-Yse Hsiedh, Shybut and Lotsof (1969) reported Anglo-Americans to be most internal when compared to American-born Chinese and Hong Kong-born Chinese. In the majority of ethnic studies, individuals of low social status defined by class or race tend to be more external.

Socioeconomic Status

The literature describes a relationship between high social status and internal locus of control belief. Specifically, this relationship is supported by findings from a study of 1,000 individuals in a national stratified sample (Franklin, 1963). In another study which included interviews of 258 men and women over the age of 65, Hunter, Linn, Harris and Pratt (1980) found socioeconomic status to be the best discriminator between internals and externals. In this latter study, internals were reported to be of higher socioeconomic status compared to externals. Hunter, et al. (1980) suggest that restrictions in income, education, and mobility that accompany low socioeconomic status contribute to an external orientation.

Level of Education

A substantial amount of research concerns locus of control and learning. However, few studies have been concerned with the

relationship between varied levels of education and belief in control. Studies that are reported in the literature support either a minimal relationship or no relationship between locus of control and level of education. For instance, in a study of 923 elementary and high school students, Crandall, Katkovsky, and Crandall (1965) reported no differences in internality at varied grade levels. The only study that reported an association between locus of control and education was performed by Wallston, Wallston and DeVellis (1978). These researchers found a significant but low negative correlation between educational level and belief in powerful others controlling health. However, the bulk of research suggests that locus of control is predictive of academic performance only among persons who place a high value on achievement (Naditch & DeMaio, 1975; Hjelle, 1970; Lefcourt, 1966). Since internals show more striving for achievement (Rotter, 1966), it seems logical to expect internals to be more successful academically than externals (Prociuk & Breen, 1974). Thus as a reflection of academic success, persons with greater years of education would be more internally oriented.

Employment Status

A major effect of unemployment is a sense of powerlessness. When work is taken away, certain aspects of life are perceived as beyond personal control. O'Brien and Kabanoff (1979)

provide insight into the relationship between employment status and belief in locus of control. In their study of employed and unemployed workers from varied occupations and socioeconomic levels, O'Brien and Kabanoff reported more physical health symptoms and a more external locus of control among unemployed workers. The small sample size of unemployed workers, (74), compared to the large number of employed, (1,383), must be considered before results can be generalized.

Support Systems

Investigations into the relationship between support systems and locus of control orientations are scarce. In one study by Phares and Lamiell (1974) internals were reported to rely less than externals on the help, sympathy, or financial aid of others. Phares (1978) further suggested that the nature of the helping situation and extent to which the internal's achievement motivation is engaged determine the importance of support systems on locus of control beliefs.

Effects of Chronic Illness

Chronic illness represents a threat in the life of an individual. Reaction to such a threat depends on a variety of factors. Lipowski (1970) suggested three major factors which influence an individual's response to an illness. First, there are intrapersonal factors, which include the

following: age; personality; intelligence; specific skills; values and beliefs; emotional state; and cognitive capacity at the onset and throughout the illness. Secondly, according to Lipowski, there are disease-related factors such as type of illness, bodily location, rate of onset and progression, degree of reversibility, and other aspects of the pathological process which influence response to an illness. Finally, there are environmental factors including social and "non-human environments" of the sick which contribute to reaction to an illness (Lipowski, 1970).

In the present study, locus of control beliefs and aspects of memory represent intrapersonal factors associated with chronic illness. Length of illness, type of illness, health perception, and length of hospitalization are disease-related and environmental factors influencing response to illness. Although not all studies relating these factors to chronic illness address locus of control beliefs, some tentative parallels can be drawn.

Physical Illness

Research linking locus of control beliefs and specific physical illnesses is minimal. Cromwell, Butterfield, Brayfield, and Curry (1977) reported greater externality among coronary

patients when compared to controls who had comparable serious illness. Male hemophiliac children age 12 and over were found to be more internal than controls according to Bruhn, Hampton, and Chandler (1971).

In studies of end-stage renal disease patients, findings regarding locus of control beliefs are scarce and contradictory. In one study of 24 long-term male hemodialysis patients, Goldstein (1976) reported significantly greater externality and denial among dialysis patients compared to male patients recovering from minor medical problems such as hernia, pneumonia, bone fractures, and appendicitis. Smith and Carson (1981) found contradictory results utilizing the MHLC Scale. In their study, Smith and Carson found high internality among 28 dialysis patients. Internality, according to these investigators, increased as years in dialysis increased. These findings should not be generalized, since the sample was small, there was a 17% attrition rate in the study, and characteristics of the subjects were not described.

Health Perception

Physical disability may represent a greater threat to individuals who perceive they have little control over events in their lives. In a study of locus of control beliefs and perceived effect of physical disability in healthy graduate

students, MacDonald and Hall (1971) found externals rated physical disability as more socially and personally debilitating than internals. In another study comparing healthy and physically disabled persons, Lipp, Kilstoe, James and Randall (1968) recorded differences between locus of control orientation and perception of disability. Specifically, those disabled persons who scored in the middle range on an I-E scale were significantly more denying of disability than persons who were highly internal, external, or not disabled. In contrast, healthy persons who scored in this same middle range on the I-E scale were significantly less denying of disability than nondisabled persons who were highly internal or external. In addition, Lipp et al. (1968) found disabled persons who were internally oriented to be more denying of disability than externals who were disabled. It may be that perception of the extent to which illness restrains the individual influences locus of control beliefs.

Length of Illness

Wendland (1973) supported the contention that locus of control beliefs are influenced by onset and length of illness. In a study of subjects with musculoskeletal impairment who had been disabled less than one and a half years, Wendland (1973) reported more externality than in subjects disabled for three

or more years. This finding suggests that there is greater externality among persons who have been ill a shorter length of time. This contention is in accord with the findings of dialysis patients in a study by Smith and Carson (1981).

Length of Hospitalization

Literature on locus of control includes several studies noting the importance of present circumstances on locus of control beliefs. One circumstance common to the chronically ill is hospitalization, which as a form of confinement may render an individual powerless or demand the individual exert personal control. However, only a single study by Hunter, Linn, Harris and Pratt (1980) investigated the relationship between length of hospitalization and locus of control beliefs. These researchers reported that number of days in the hospital was not a significant discriminator of internality or externality among 258 men and women age 65 and over.

In other studies, situational circumstances which may be similar to hospitalization have been examined in relation to locus of control beliefs. For example, Kiehlbauch (1967) studied locus of control orientation among inmates with varied sentences. According to this investigator, length of confinement influenced locus of control. Kiehlbauch found that inmates

prior to release from confinement reverted from an internal to an external orientation.

In an investigation of a population of elderly, Driver (1974) found greater internality associated with longer length of stay in an apartment. In contrast, Shybut (1968) reported higher external control among patients at a neuropsychiatric hospital who had been hospitalized for a longer length of time. The type of environment may account for locus of control orientations. In highly constraining environments, locus of control beliefs may reflect the loss of control over management of one's life.

Memory

Chronic illness may result in changes in everyday cognitive functioning. Changes in ability to function independently have the potential of influencing locus of control beliefs. Of special interest to this present study is memory function. One study which addressed memory and locus of control examined the relationship between ability to function and beliefs in control among 258 elderly persons (Hunter, Linn, Harris & Pratt, 1980). From interviews and self-assessments of ability to function, Hunter and colleagues (1980) reported significant correlations between locus of control and level of functioning. Among other factors, the ability to

remember things in the recent past related positively to internal locus of control; the tendency to forget as well as other factors were associated with an external locus of control. It seems that an external orientation results when the constraining circumstance of inability to remember is present.

In summary, the many facets of chronic illness have potential for influencing an individual's locus of control. All chronic illnesses are not equal in disability and perceived controllability. When an individual is more helpless than previously, beliefs about locus of control are expected to relate to reactions to the disorder and the struggle to recover. Cardiovascular disease and end-stage renal disease represent two chronic illnesses of interest in the present study and are compared in the next section of the literature review.

End-Stage Renal Disease

End-stage renal disease (ESRD) as defined by Lancaster (1979) is an "irreversible kidney disease causing chronic abnormalities in the internal environment and resulting in treatment with dialysis or kidney transplant for survival" (p. 4). This irreversible kidney damage results from various diseases of the urinary tract as well as the kidney, systemic diseases, drug damage, shock, or trauma (Burton & Hirschman,

1979). As a chronic illness, ESRD is both widespread and devastating. The Kidney Association of America (1981) has estimated that greater than 13 million Americans suffer from this disease and greater than 54,000 die each year. The profile of patients with ESRD and the impact of this illness on these patients is the focus for the following review of the literature.

The literature categorizes end-stage renal disease (ESRD) according to treatment modality, i.e., dialysis versus renal transplant. However, the nature of this disease is such that this division is not binding. Many dialysis patients undergo renal transplant only to reject the kidney and revert back to dialysis treatments. The present study was undertaken with renal disease patients undergoing dialysis primarily. Age, sex, ethnicity, employment status, locus of control, and other personal adjustment characteristics describing dialysis patients are considered in the following review of the literature.

Age

The average age of dialysis patients has gradually increased from 40 in 1970 to between 50 and 55 years in 1979 (Burton & Hirschman, 1979; Kolata, 1980). According to the Bureau of Quality Assurance of the U. S. Public Health Service, patients between 45 and 64 years of age represent 42% of the current

(1979) total dialysis population. Burton and Hirschman (1979) have attributed this increase in average age of the dialysis patient to the availability of federal funding for dialysis treatment which began in 1973.

Sex

The ratio of women to men dialysis patients has increased. In 1970 the percentage of women was 32%; in 1979, the percentage increased to 48.5% (Burton & Hirschman, 1979).

Ethnicity

In a 1979 survey of 31,000 dialysis patients from five dialysis centers, 70% were white; 24.2% were blacks; 3.3% belonged to other racial groups; and 1.9% had not been categorized (Burton & Hirschman, 1979). This represents a high incidence of kidney failure in blacks, considering that blacks comprise approximately 12% of the population in the United States. In a study of 2,481 patients from 18 dialysis centers in the United States, Gutman, Stead, and Robinson (1981) found 45% of the patients were black, Oriental, American Indian or Hispanic. The geographic locations of the dialysis centers sampled may explain this large percentage of non-whites.

Employment Status

Loss of a job due to treatment complications and dialysis

has been noted in patients with end-stage renal disease (Wright, Sand & Livingston, 1966). Gutman, Stead and Robinson (1981) reported that 44% of the 2,481 patients in their study were not working and 50% of these patients were too sick to work, regardless of level of education or previous employment status. According to Friedrich (1980), 75% of the sample were employed during dialysis; 20% were unemployed before dialysis. The increasing age and incidence of kidney disease among lower socioeconomic groups may explain in part this low employment rate in dialysis patients. Findings by Friedrich (1980) are consistent with results of these studies.

Other Factors

Several stressors have been identified as common to patients with end-stage renal disease. Wright, Sand and Livingston (1966) categorized these stressors as: 1) losses in physical health, social activities, finances and community status; 2) injuries or threats of injury to the body and shunt area; and 3) frustrations associated with the restrictive life-long medical regimen. These stressors may result in the perception among dialysis patients that health is controlled by something or someone external (Gentry & Davis, 1972).

Chronic dependency associated with end-stage renal disease

has been cited frequently in the literature (Glassman & Siegel, 1970); Hickey, 1972; Pritchard, 1974a, 1974b, 1976; Hagberg, 1974; De-Nour & Czaczkes, 1976). One explanation for this dependency is loss of mastery over life and dependency upon machines De-Nour & Czaczkes, 1976). Since these patients do not return to health as dialysis treatments continue, the full sense of mastery over life does not return. The literature describes dependency in these patients but few relate this dependency to locus of control beliefs.

Studies of locus of control beliefs among dialysis patients have almost consistently reported an external perception of control (Goldstein & Reznnikoff, 1971; Goldstein, 1976; Gentry & Davis, 1972). Only one study by Smith and Carson (1980) found increased internality as the length of time on dialysis increased. However, there was a high attrition rate and small sample size. Thus, findings should be interpreted cautiously.

Changes in memory functioning have been cited in dialysis patients. Dialysis dementia, characterized by memory disturbance and other manifestations, has been documented in recent research (English, Savage, Britton, Ward & Kerr, 1978); Ziesat, Logue, & McCarty, 1980). In the latter study by Ziesat et al. (1980)

some support was found for the hypothesis that as amount of time on dialysis increased, memory function declined. In addition, these investigators noted that the average memory score for the 28 dialysis patients in the study was in the "mildly impaired" range. The effect of memory disturbance in the lives of dialysis patients may in part explain the limitations in employment and social activities as well as perceptions of control.

The impact of end-stage renal disease has been documented by Levy (1977). Based on a four-year study of 25 male and female dialysis patients of varied educational and occupational backgrounds, Levy described three distinct psychological periods of adaptation once dialysis was initiated. First was the "honeymoon" period, lasting 6 weeks to 6 months after dialysis started. This initial period of adaptation to dialysis was characterized by acceptance of dependency on the dialysis staff. A period of disenchantment and discouragement then followed. This period lasted from 3 to 12 months and was accompanied by feelings of sadness, hopelessness and helplessness. According to Levy, the period of adaptation follows this state of discouragement. It is recognized by the dialysis patients' acceptance of the limitations and restrictions of dialysis.

Denial has been cited as the most common defense mechanism

employed by dialysis patients to buffer the intense feelings of helplessness (Levy, 1977). The work of Wright, Sand and Livingston (1966) supported this finding. In their investigation of 12 chronic dialysis patients over a 6 to 33 month period, these patients scored higher on the Hysteria Scale of the MMPI than healthy subjects. The Hysteria Scale is sensitive to repressive tendencies. It may be that a defense mechanism such as denial facilitates adaptation to the demands of this illness.

In summary, a profile of the end-stage renal disease patient undergoing dialysis may be described as 50+ years of age, white, unemployed, and externally oriented. Living with such a chronic illness, this patient experiences cognitive, psychological, and social disturbances. Knowledge of the demographic and psychological factors associated with this chronic illness may increase understanding of health locus of control beliefs. The next section describes a profile of the patient with chronic cardiovascular disease.

Cardiovascular Disease

Cardiovascular disease represents a broad category of illnesses affecting the heart and blood vessels which cause the death of approximately one million Americans each year

(American Heart Association, 1981). The cost to the nation for 1982 from cardiovascular disease has been estimated to be 50.7 billion dollars (American Heart Association, 1981). Currently, nearly 42,000 Americans have one of the following disease entitles within this category of illness: coronary artery disease, cerebrovascular disease, hypertension and hypertensive heart disease, rheumatic fever and chronic rheumatic heart disease, and chronic nephritis. For the purpose of the present study, only coronary artery disease is reviewed.

Age

Based on data from the Framingham Study, persons are at greatest risk for developing heart disease between 55 and 70 years for males and 60 to 70 years for females (Kannel, 1976).

Sex

There is a sex differential in coronary heart disease. Coronary artery disease afflicts males two to six times more often than females, when age is controlled (Jenkins, 1979). Although the death rates from cardiovascular disease have declined in the last 30 years for both men and women, the rate of decline has been greater for women than for men (Johnson, 1977). Based on these findings, it seems that men are at greater risk for coronary artery disease than women.

However, other risk factors must be considered before predicting which individuals are likely to develop coronary artery disease. In particular, age has been reported to interact with gender (Johnson, 1977). According to Johnson, the incidence of coronary artery disease increases with age and is much higher among men.

Ethnicity

Figures from the American Heart Association (1981) indicate that blacks in the United States have a greater risk of developing coronary artery disease than whites because of a higher prevalence of hypertension in blacks. Data from Wilder (1974) indicates that coronary artery disease is most prevalent among whites in comparison to all other racial groups.

Employment Status

Many studies reported in the literature examine the relationships among employment status, education, gender and coronary artery disease. Russek and Russek (1976) found that at the time of coronary occlusion, 91% of 100 patients (compared to 20% of healthy controls) had been working two or more jobs or working greater than 60 hours per week. These same patients were experiencing discontent with their employment.

Haynes and Feinleib (1980) examined the relationship between employment status and the incidence of coronary heart disease among men and women in the Framingham Study. These investigators reported that working women and men who were retired or unemployed at the time of the study had the highest rates of coronary heart disease. Among women in the study, clerical workers with children were almost twice as likely to develop coronary heart disease as either white- or blue-collar workers. For men, higher rates of coronary heart disease were found among white collar workers in comparison to blue-collar and clerical workers (Haynes & Feinleib, 1980).

Return to work after the first myocardial infarction was investigated by Garrity (1973). He found a correlation between work status and socioeconomic status after infarction. Individuals who were of higher socioeconomic status were more likely to be working 6 months after infarction than those with lower socioeconomic status. In addition, Garrity reported that individuals who were external and who favorably perceived their health were more likely to return to work after myocardial infarction. An association between favorable health perception and employment status before infarction was found. Persons who were not working before their coronary saw themselves as more sick than the rest of the population.

Other Factors

Coronary heart disease has been linked to coronary-prone or Type A behavior (Russek & Russek, 1976; Rosenman, Brand, Jenkins, Friedman, Straus, & Wurm, 1975; and others). Such a behavior pattern is characterized by a competitive drive, ambitiousness, aggressiveness, time urgency, and other behaviors identified by Friedman and Rosenman in the late 1950's. In contrast, persons with Type B behavior exhibit few of the above traits. Rosenman, Friedman, Straus, Jenkins, Zyzanski, and Wurm (1970) found that Type A individuals developed 2.3 times the rate of coronary heart disease compared to Type B individuals.

Coronary-prone or Type A behavior has been associated with high income and occupational status in employed men and women (Waldron, 1978). In comparing employment status in women, Waldron found that women who were employed full-time had higher Type A scores than women who were employed part-time or not employed outside the home. From these findings, Waldron suggested that coronary-prone behavior is correlated with occupational status in women and may be related to upward mobility.

Glass (1977) proposed a relationship between control over the environment and Type A behavior. According to Glass, the

frantic pace set by Type A individuals is a response to a need for maintaining control over the environment. In situations which are uncontrollable, Type A individuals attempt to establish control. On the other hand, Type B individuals do not attempt to establish control in such situations since they are less likely to perceive lack of control over uncontrollable events in life.

Some studies have related Type A and B behavior to locus of control orientation. Nowack and Sassenrath (1980) suggested that high-risk coronary-prone individuals exhibiting Type A behavior and external locus of control possessed more anxiety than Type A internals or any Type B individuals. Cromwell, Butterfield, Brayfield, and Curry (1977) found coronary patients to be significantly more external than medical controls, although differentiation of coronary patients into Type A or B was not attempted. In contrast, Strickland (1979) equated Type A behavior with internal control of reinforcement.

Coronary artery disease results in threats to life and self-esteem. To cope with these threats, denial was found to be a common strategy employed by 445 patients in a coronary care unit (Cassem & Hackett, 1977). Croog, Shapiro and Levine (1971) in a study of 345 male patients suggested that denial

is a continuing, long-term mode of adaptation for coronary disease patients. This contention was based on their finding that deniers tend to minimize the effect of coronary occlusion on life span and to deny experiencing symptoms. At one month and at one year after infarction, Croog et al. (1971) reported they were able to differentiate responses of deniers versus nondeniers.

In summary, cardiovascular disease is a chronic illness in which demographic, psychological, and illness-related factors interact. The typical patient with coronary artery disease is male, white, 55 or more years of age, employed, and externally oriented. In comparison to end-stage renal disease patients, coronary artery disease patients are older, employed more often, contain a lesser proportion of blacks, and are more often males. Both groups are externally oriented and tend to exhibit dependency although end-stage renal disease patients may be more dependent. Denial is a defense mechanism employed by both patient groups in response to the demands of the illness. Both cardiovascular disease and end-stage renal disease are chronic illnesses which may affect beliefs in control over health.

Purpose of the Study

There are two purposes of this research. The first purpose is to determine the extent to which selected demographic

and illness-related variables individually affect health locus of control beliefs of cardiovascular disease and end-stage renal disease patients. The demographic variables include age, sex, marital status, ethnicity, years of education, socioeconomic status, and employment status. Illness-related variables include diagnostic category, length of illness, perception of health, length of hospitalization, and the cognitive function of memory. The second purpose of this research is to determine the combination and order of characteristics that are predictive of health locus of control beliefs.

CHAPTER II

METHODS

Subjects and Setting

Subjects for this study were part of a larger, federally-funded project entitled, "Patient Teaching: Trait-Treatment Interaction". The project is under the direction of Dr. May Rawlinson, Principal Investigator, Oregon Health Sciences University. That study was initiated in September, 1978, with the principal aim of discovering interaction effects of teaching strategies and person variables on the patients' medication-taking knowledge, behaviors, and attitudes.

A total of 151 patients from seven hospitals with either cardiovascular disease or end-stage renal disease were included in the present study. Patients met the following criteria. They were:

(1) eighteen years of age or older

(2) without sensory impairments such as blindness or deafness

(3) capable of reading and speaking the English language

(4) in the non-acute stage of illness

(5) able to perform adequately on the Digit Span of the Wechsler Memory Scale

(6) taking two of the oral medications included in this study

(7) living within traveling distance of the hospital for a home interview

(8) expected to manage medication at home

(9) lacking medication knowledge as evidenced by a low score on two medication-knowledge pretests.

Of the original sample, 26 patients dropped out of the study because of refusal to continue, early hospital discharge, or discontinuation of medications. As a result, the final sample consisted of 125 patients. Sixty-four were cardiac patients and 61 were end-stage renal disease patients.

Seven hospitals in metropolitan areas of California and Oregon were sampled. These facilities were state, federally, or privately operated. In California, two proprietary hospitals provided subjects with end-stage renal disease. Both hospitals average 400-500 beds and contract with a community dialysis unit for nurses to perform dialysis treatments. One hospital averaged 52 dialysis patients in six months; the other facility treated an average of 20 patients in six months. All patients were under the management of five nephrologists. A privately owned 175 acute-bed hospital provided patients with cardiovascular disease from a 35-bed cardiac unit.

In Oregon, end-stage renal disease patients were selected from a Veterans Administration hospital, a state-operated facility, and a private hospital. The Veterans Administration teaching facility with 490 general medical-surgical beds contains a hemodialysis unit serving inpatients, outpatients, and home-training patients. The unit has a capacity of 15 beds and dialyzed approximately 53 patients per week. Similarly, the state-operated teaching hospital with 351 general medical-surgical beds and a hemodialysis unit of eight beds, averaged 46 dialysis treatments each week to inpatients and outpatients. The privately-operated 539 bed teaching hospital provided subjects from an 18 bed nephrology unit. The inpatient hemodialysis unit has an eight-bed capacity.

Cardiovascular disease patients in Oregon were chosen from the same Veterans Administration hospital and state-operated facility. Patients from the VA hospital were chosen from a 60 bed cardiology unit; patients from the state facility were selected from multiple general medical units. In addition, a privately-operated, 451 bed hospital provided patients from two 26 bed cardiac medical-surgical units.

Data Collection Instruments

Predictor Variables

A Patient Profile Questionnaire (Appendix A) was used to

collect data pertaining to demographic and illness-related characteristics of patients. Demographic variables included in this study were age, sex, marital status, ethnicity, years of education, and employment status. Illness-related variables were length of illness, length of hospitalization, and diagnostic categories of either cardiovascular disease or end-stage renal disease. Utilizing the Duncan and Reiss Socioeconomic Index (Reiss, Duncan, Hall & North, 1961), socioeconomic status was assigned to patients; values may range from 0 to 100.

Two subscales from the Wechsler Memory Scale (Wechsler, 1945) were used to collect data pertaining to memory. To measure attention and concentration, the Digit Span subscale was administered. Digits were presented to the patient in two series. In the first series, the patient repeated digits in a forward direction; in the second series, digits were repeated backwards. Two trials were administered at each level until the patient missed on both trials. There were nine digits in the forward pair and eight digits in the backwards pair. The total score is the number of digits in the longest series which is repeated without error, both forward and backward. Thus scores may range from 0 to 17.

Associate Learning, a second subscale of the Wechsler

Memory Scale, was used. This measures the subject's ability to form and retain new word associations. On this task, the patient was presented with a list of ten-paired words. Six of these were easy associations and four were difficult. In a recall task, the patient was supplied with the first word of the pair and asked to respond with the second word from memory. If the response was correct the patient was told, "Right." If the response was incorrect, the patient was told, "No," and the correct word was supplied. This procedure was performed three times. Scores may vary from 0 to 21.

The Health Perceptions Questionnaire (Ware, 1976) was used to collect data pertaining to perception of health status. this questionnaire yields eight scales, four of which were used in this study (Current Health, Health Worry/Concern, Resistance/ Susceptibility, and Rejection of the Sick Role). Each scale is comprised of statements which the patient was asked to rate on a five-point Likert-type scale. Respondents circled the number best corresponding to their belief in the statement. Responses may vary from definitely true to definitely false (Appendix C). Scale scores range from 5 to 45. Scoring high on a scale indicates presence of that health perception; low scores indicate an absence of that health perception.

Criterion Variables

Locus of control was assessed by means of the

Multidimensional Health Locus of Control Scale (Wallston, Wallston & DeVellis, 1978). This is a self-administered instrument of 18 items utilizing a six-point Likert-type scale to measure responses describing health-related beliefs (Appendix D). The responses may vary from "strongly disagree", scored as one, to "strongly agree", scored as six. Each of the three subscales (Internal, Powerful Others, and Chance) is composed of six statements. Subscale scores may range from 6 to 36. Therefore, a low score indicates little belief in control by oneself, by powerful others, or by chance. A high subscale score indicates a high belief in the construct of the particular subscale. Those scoring high on the Internal scale believe that they have control over their health and that they become healthy or sick as a result of their own actions. Those scoring high on the Powerful Others scale believe that control for health or illness lies with professional persons or family members. A high score on the Chance scale indicates a belief that fate or other luck factors determine health or illness.

Wallston et al. (1978) reported initial internal consistency and validity data for the Multidimensional Health Locus of Control Scale. Alpha reliabilities ranged from 0.67

to 0.77 and compared positively to alpha reliabilities of Levenson's (1974) Internal, Powerful Others and Chance scales which ranged from 0.51 to 0.73 (Wallston, et al., 1978). Low positive correlations of the Multidimensional Health scales with appropriate Internal, Powerful Others, and Chance scales devised by Levenson (1974) were reported for initial concurrent validity. Chance Health locus of control and Powerful Others Health locus of control were significantly positively correlated (Wallston & Wallston, 1978).

Design and Procedure

In this correlational study, the predictor variables are age; sex; marital status; ethnicity; socioeconomic status; years of education; length of illness; employment status; length of hospitalization, diagnosis; memory; and health perception. Health perception includes Current Health, Health Worry/Concern, Resistance/Susceptibility, and Rejection of the Sick Role. The criterion variable is health locus of control, comprised of three aspects: (1) internality, (2) powerful others, and (3) chance.

In order to select patients for this study, charts and kardexes were reviewed by graduate students or masters-prepared nurses who served as research assistants. Patients who met the criteria for selection were invited to become subjects in the study and were asked to sign a consent form (see Appendix E).

Approximately four days prior to discharge, the interviewer trained in interviewing and testing administered the Patient Profile

Questionnaire, the Multidimensional Health Locus of Control scale, and the Health Perceptions Questionnaire. The Patient Profile Questionnaire was administered by bedside interview. A copy of the Multidimensional Health Locus of Control scale and the Health Perceptions Questionnaire were presented to the patient for completion. The interviewer remained with the patient to clarify any questions.

Data Analysis

This study was correlational in nature. Data were analyzed to determine relationships among variables utilizing the Pearson *r* statistic. Predictor variables were selected which most highly correlated with the criterion variables. Eleven predictor variables were entered into a stepwise multiple regression analysis to determine which combination and order of characteristics best predicted locus of control.

CHAPTER III

RESULTS AND DISCUSSION

This chapter contains both the results and discussion of the study and is presented in the following sections. First, demographic and illness-related characteristics of the sample are identified. Second, correlations between health locus of control beliefs and demographic and illness-related characteristics are presented. Finally, results of the regression analysis are reported, indicating the relative contributions of the selected variables in explaining health locus of control beliefs.

Selected Demographic and Illness-related Characteristics of Subjects

A summary of demographic characteristics of the total sample (N=125), cardiovascular patients (N=64), and end-stage renal disease patients (N=61) is presented in Table 1. The majority of the sample (90%) were white, with slightly greater than half of the patients being male. The mean age of the total sample was 53.6 years, with a range of 19 to 78 years. This represents a group of individuals in late middle life. Patients with cardiovascular disease significantly differed in age compared to patients with end-stage renal disease. In general, the renal patients were younger. This is consistent with the literature (Burton & Hirschman, 1979; Kannel, 1976). Greater than 60% of the sample were presently married, but significantly fewer renal patients were married.

Table 1
Demographic Characteristics of Cardiac and Renal Subjects

Characteristics	Cardiac (N=64)	Renal (N=61)	Combined (N=125)	Significance of Difference
Age Mean (S.D.)	59.55 (9.13)	47.36 (15.32)	53.60 (13.90)	t = 5.43**
Sex - Male	41	33	74	n.s.
Female	23	28	51	
Marital Status				
Married	47	30	77	χ^2 = 6.27*
Not Married	17	30	47	
Missing		1	1	
Ethnicity				
Caucasian	58	54	112	n.s.
Other	6	7	13	
Education in Years				
Mean (S.D.)	12.47 (2.99)	12.41 (2.15)	12.44 (2.60)	n.s.
SES[a] Mean (S.D.)	43.35 (25.49)	41.67 (21.89)	42.51 (23.64)	n.s.
Employment				
Full/part time	23	17	40	n.s.
Unemployed	6	17	23	
Retired	26	19	45	
Missing	9	8	17	

[a]Duncan and Reiss Socioeconomic Index
*p < .05 **p < .01

Note: Statistical differences between means was determined by t-test. A chi-square test was used to determine whether the frequencies of responses differed among groups when variables were discrete.

The average level of education was 12.44 years. This is consistent with 33% of the general American population of this same age (U. S. Bureau of the Census, 1979) who completed one to three years of college. The mean score on the Duncan and Reiss Socioeconomic Index was 35.01 on a 100-point scale. This indicated a socioeconomic status represented by those in skilled or semi-skilled occupations. Slightly greater than half of the patients were outside of the work force, either unemployed or retired. Only one third were either working full or part time. Thus, this sample of patients, considerably below retirement age and of average education, were of low socioeconomic status and unemployed.

For memory function measured by digit span, cardiovascular disease and end-stage renal disease patients averaged 10.68. This finding indicates that these patients had average cognitive function in ability to pay attention and concentrate. Similar mean scores for normal subjects age 40 to 49 years and for institutionalized subjects age 60 to 69 years were reported by Wechsler (1945) and Cauthen (1977), respectively.

For the memory function measured by Associate Learning scale, a mean score of the combined group of patients was 13.23. This mean score is comparable to the average scores for 40 to 49 year old subjects (Wechsler, 1945) and for 60 to 69 year old subjects in the study by Cauthen (1977). Thus, despite physical limitations of their illnesses, patients in the present sample were able to retain adequate cognitive function to concentrate, remember, and form new associations in concepts. On the average, cardiovascular

disease patients differed significantly from end-stage renal disease patients in this aspect of cognitive function. End-stage renal disease patients had higher scores on the average than did cardiovascular disease patients.

In summary, cardiac and renal patients differed in age, marital status, and associate learning, with renal patients being younger, unmarried, and better able to form new associations in concepts. Perhaps decrements in memory which accompany aging (Parkinson & Perey, 1980) could explain the lower associate learning scores among the older cardiovascular disease patients. However, despite minor demographic and cognitive differences, cardiac and renal patients were quite similar. Thus, in this present study, the data were combined from both patient groups for purposes of data analysis.

Illness -related characteristics of the patients included diagnostic category, length of illness in years, length of hospitalization in days, and perception of health. As shown in Table 2, the sample was almost equally divided among the diagnostic categories of cardiovascular disease and end-stage renal disease. The mean length of illness for the combined group was 8.4 years, confirming the chronic illness status of this sample.

At the time of data collection, the patients had been hospitalized for an average of 9.31 days. This was longer than the average stay of patients in the United States (American Hospital Association, 1980). This finding reflects the debilitating nature of end-stage

renal disease and cardiovascular diasese. Combined with length of illness, the longer than average hospital stay could explain the high percentage of unemployment in this sample. This population would have difficulty maintaining employment with long-term illness and lengthy periods of hospitalization.

As shown in Table 2, the combined sample achieved a mean score of 18.15 on the perception of current health scale. This low score indicates an unfavorable perception of present health which was also related to perceived past health and health outlook (Ware, 1976). Considerably higher scores for individuals from the general population were reported by Ware (1976) as presented in Table 3. On the average, the sample population in the present study differed significantly from Ware's (1976) sample. Thus, the finding in the present study is consistent with findings of Ware (1976) who reported less favorable health perceptions in subjects of older age and with limitations in role activity, sickness, chronic health problems, and worry.

Subjects in the present study averaged a score of 13.03 on the Health Worry/Concern scale. Compared to the general population studied by Ware (1976), this score indicated an unfavorable perception of future health. Thus, this group of patients with a chronic illness are concerned about the outlook of their health. As indicated in Table 3, the sample in the present study differed significantly from the population in Ware's (1976) study. Considering the irre-

Table 2

Illness-Related Characteristics of Cardiac and Renal Subjects

Characteristics	Cardiac (N=64) Mean (S.D.)	Renal (N=61) Mean (S.D.)	Combined (N=125) (Mean (S.D.)	Significance of Difference
Cognitive Function[a]				
Digit Span	10.73 (2.13)	10.62 (1.77)	10.68 (1.96)	n.s.
Associate Learning	12.66 (3.16)	13.84 (3.58)	13.23 (3.41)	t = -1.95*
Length of Illness[b]	8.56 (11.21)	8.20 (8.41)	8.38 (9.91)	n.s.
Length of Hospitalization[c]	8.91 (7.11)	9.74 (9.67)	9.31 (8.44)	n.s.
Current Health[d]	19.32 (7.67)	17.02 (6.05)	18.19 (6.99)	n.s.
Health Worry/Concern[e]	13.14 (2.78)	13.13 (2.08)	13.14 (2.45)	n.s.
Resistance/Susceptibility[e]	14.29 (3.18)	12.67 (3.82)	13.49 (3.59)	t = 2.09*
Rejection of the Sick Role[d]	15.35 (3.22)	15.87 (2.52)	15.61 (2.90)	n.s.

*p < .05

[a]Wechsler's Memory Scale

[b]in years

[c]in days

[d]Scores range from 9-45

[e]Scores range from 4-20

Table 3

Health Perception Comparisons Between Present Sample and Those of Ware

Health Perception	Present Study N=125	Ware (1976) N=1599	Significance of Difference
	Mean (S.D.)	Mean (S.D.)[a]	
Current Health	18.19 (6.99)	32.79 (7.67)	t = -20.56*
Health Worry/Concern	13.14 (2.45)	11.70 (2.87)	t = 5.54*
Resistance/Susceptibility	13.49 (3.59)	14.86 (2.80)	t = -5.09*
Rejection of the Sick Role	15.61 (2.90)	11.23 (2.43)	t = 19.38*

[a]Average of means and standard deviations from three field tests on healthy subjects.

*$p < .01$

versibility of end-stage renal disease and cardiovascular disease, the finding of greater worry in patients in the present sample is not surprising.

The mean score for the scale Resistance/Susceptibility was 13.50, a score lower than the general population reported in a study by Ware (1976). Thus, in the present study, patients with chronic illness perceived themselves as more susceptible to poor health in the future than a general population. As presented in Table 2, renal patients differed significantly from cardiovascular patients in this perception of health. Thus, end-stage renal patients perceived themselves as more susceptible to unfavorable health in the future than did cardiovascular disease patients. Although denial is common to both end-stage renal disease and coronary artery disease patients (Cassem & Hackett, 1977; Levy, 1977; De-Nour & Czaczkes, 1972), the finding in the present study suggests that the cardiac patients may be employing greater denial in assessing future health status. Or, it may be that the therapy of renal patients interferes with denial. When faced with frequent dialysis treatments, renal patients may be reminded of their unfavorable health status. As a result, these patients are unable to employ denial in relation to future health.

The present sample averaged a high score on Rejection of the Sick Role scale, indicating a tendency to resist letting illness interfere with their lives. The mean score of 15.48 was higher than the average score for a general population reported by Ware

(1976). Consistent with Ware's (1976) finding that rejection of the sick role increased with age, the finding in the present study of chronically ill late middle-aged persons is not surprising. The tendency to reject the sick role may reflect striving for independence. Thus, despite the demands placed on them by their illness, this present sample of patients who have reported illness for greater than eight years may have made adjustments in their lives and do not perceive themselves in the sick role.

In summary, this sample of chronically ill renal patients and cardiac patients had experienced a lengthy illness and had recently completed a longer than average period of hospitalization. These patients perceived their present health as unfavorable, were worried about future health, and assessed themselves as susceptible to further illness. Despite these perceptions, this group of chronically ill persons were striving to not let illness interfere with their lives.

Description of Health Locus of Control Variables

The Multidimensional Health Locus of Control Scale (Wallston, et al., 1978) was used to measure beliefs in health locus of control. The mean scores for patients in this sample and for subjects studied by Wallston, et al. (1978) are presented in Table 4.

The mean score for the scale Internal Health Locus of Control was 24.57. This score fell close to the average score of 25.10

Table 4

Comparison of Mean Values for Health Locus of Control Scales between Cardiac and Renal Patients

Scale[a]	Cardiac N=64) Mean (S.D.)	Renal (N=61) Mean (S.D.)	Significance of Difference[c]
Internal HLC[b]	25.20 (5.92)	23.90 (5.83)	n.s.
Powerful Others HLC[b]	25.38 (5.15)	25.21 (5.42)	n.s.
Chance HLC[b]	18.44 (6.37)	17.80 (5.15)	n.s.

[a]Multidimensional Health Locus of Control Scale (Wallston, et al., 1978)

[b]Scores range from 6 to 36

[c]t-tests were used for this analysis

reported by Wallston, et al. (1978) for healthy subjects who were approximately 42 years of age with some college education. The finding in the present study was not consistent with the literature which reported greater belief in externality as individuals became older (Phares, 1976; Hunter, et al., 1980; Schultz, 1976) and among cardiac and renal patients (Cromwell, Butterfield, Brayfield & Curry, 1977; Goldstein, 1976). It is interesting that the patients in the present study, although perceiving their health as less favorable than a general population, do believe in their ability to control health similar to that of healthy persons.

The average score for the scale Powerful Others Health Locus of Control was a higher mean score than the normative group of healthy subjects studied by Wallston, et al. (1978). As presented in Table 5, the combined sample of patients in the present study were significantly different from those in the study by Wallston, et al. (1978). Thus, this finding is consistent with the literature for cardiovascular disease and end-stage renal disease patients which reports a greater than average belief in external forces controlling health (Cromwell, et al., 1977; Goldstein & Reznikoff, 1971; Goldstein, 1976; Gentry & Davis, 1972).

The mean score for Chance Health Locus of Control was 18.13. This score is higher than the mean score (15.57 for healthy subjects

Table 5

Comparison of Present Sample with Those of Wallston on MHLC

Scale	Present Study (N=125) Mean (S.D.)	Wallston (N=115) (Mean (S.D.)	Significance of Difference
Internal HLC	24.57 (5.89)	25.10 (4.89)	n.s.
Powerful Others HLC	25.30 (5.26)	19.99 (5.22)	t=7.85*
Chance HLC	18.13 (5.79)	15.57 (5.75)	t=3.51*

*p<.01

reported by Wallston, et al. (1978). Analysis with t-test indicated a significant difference between the combined group of sample patients and the subjects in study by Wallston, et al. (1978). Consistent with the literature (Cromwell, et al., 1977; Goldstein, 1976), cardiac and renal patients characteristically have a greater than average belief in external forces such as fate determining the outcome of their health.

In summary, cardiovascular and end-stage renal patients did not significantly differ in health locus of control beliefs. As a combined sample, cardiac and renal patients, when compared to healthy subjects, possessed similar belief in internal health locus of control and greater belief in external forces such as powerful others and fate controlling health outcomes.

Health Locus of Control Beliefs in Relation to Selected Demographic and Illness-related Characteristics

A correlation matrix indicating the relationships among the 16 predictor variables and the three health locus of control beliefs is presented in Table 6. The 16 demographic and illness-related characteristics included diagnostic category, age, sex, marital status, ethnicity, education, socioeconomic status, employment status, length of illness, length of hospitalization, digit span, associate learning, current health perception, health worry/concern, resistance/ susceptibility, and rejection of the sick role. First, the association of selected demographic and illness-related characteristics with each of the health locus of control beliefs is discussed. Second,

intercorrelations among the health locus of control scales are reported.

Internal Health Locus of Control

Age, length of illness, Current Health, Resistance/Susceptibility, and Rejection of the Sick Role were significantly correlated with belief in internal health locus of control. As indicated in Table 6, there was a low negative correlation between age and internal health locus of control. This finding suggests that these older chronically ill persons had less belief in their own actions controlling health outcomes. A portion of the literature supports this finding (Phares, 1976; Krantz & Stone, 1978; Hunter, et al., 1980; Schultz, 1976). The finding is in contrast to results of studies by Penk (1969) and Rottella and Bunker (1978) who found a belief in internality increasing as subjects became older. In the present study comprised of patients approaching retirement age and experiencing chronic illness, it is not surprising that patients assessed themselves as less responsible for determining health outcomes. In particular, aging renal patients, experiencing increased frequency of dialysis treatments, would be expected to believe less in internal control of health.

A low significant negative correlation was found between length of illness and belief in internal health locus of control. This negative correlation indicates that as duration of illness increased,

Table 6. Intercorrelations Among the 19 Variables

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1. Diagnostic Category	-	-.44*	.10	.19*	.09	-.01	-.04	.04	-.02	.05	-.03	.17*	-.11	-.02	-.06	-.17*	.00	-.23*	.09
2. Age		-	-.02	-.08	-.16	-.02	.11	.26*	.21**	.02	-.06	-.42*	-.14*	.08	-.11	.00	-.18*	.24*	-.13
3. Sex			-	.28*	.03	-.13	-.16	.03	.13	.10	-.01	.19*	-.04	-.02	-.06	-.04	-.10	-.11	.22*
4. Marital Status				-	-.05	-.19*	-.26**	.20*	-.02	.23**	.01	.01	-.08	.08	.19*	-.04	-.16*	-.11	.05
5. Ethnicity					-	-.10	-.01	-.13	.02	.00	-.02	-.01	.02	.07	.19*	-.03	.22*	-.19*	.00
6. Education						-	.50**	-.37*	-.10	-.13	.39*	.12	.00	-.11	-.33*	-.01	-.01	.03	-.08
7. SES							-	-.26*	-.04	-.14	.29**	.27**	.04	-.01	-.22**	.17	-.16	.23**	-.05
8. Employment Status								-	.22*	.16	-.15	-.22**	-.16	.16	.13	-.07	.06	.02	-.06
9. Length of Illness									-	.00	-.09	-.05	-.22*	.03	-.09	-.10	-.07	-.04	-.11
10. Length of Hospitalization										-	.07	.13	.16	.06	.10	.13	.02	.12	.10
11. Digit Span											-	.34*	-.03	.00	-.15*	-.05	-.03	-.05	-.06
12. Associate Learning												-	.13	.01	-.08	.09	-.02	-.05	.17*
13. Internal HLC													-	.16*	.01	.26*	.13	.23*	.16*
14. Powerful Others HLC														-	.23*	-.13	.13	-.12	.02
15. Chance HLC															-	-.05	.18*	-.09	.26*
16. Current Health																-	-.24*	.38*	.11
17. Health Worry/Concern																	-	-.24*	-.01
18. Resistance/Susceptibility																		-	.19*
19. Rejection of the Sick Role																			-

*p<.05, 121 df
**p<.05, 100 df

belief in one's own actions influencing health outcomes decreased. Such a finding was expected for this sample of chronically ill persons who may become more restricted by their illness as they age. This finding is inconsistent with the results of a cross-sectional study by Wendland (1973) comparing locus of control beliefs among physically disabled males diagnosed with muscular skeletal impairment. Wendland (1973) reported less belief in externality in subjects chronically disabled for three or more years compared to subjects disabled less than one and a half years. However, there are age and situational differences between Wendland's subjects and those in the present study. These differences may account for the contrasting findings. It is not known whether locus of control orientation may be adaptive in coping with a disability. In addition, Wendland (1973) reported his findings at $p < .07$, which sets a more conservative level of significance.

Both rejection of the sick role and perception of current health were found to positively correlate with belief in internal health locus of control. This finding indicates that individuals who perceived they were in good health or who resisted letting illness interfere with their lives, believed in their own actions controlling health outcomes. This is consistent with the literature (Ware, 1976; Lau & Ware, 1981; Wallston, Wallston & DeVellis, 1978; and Hunter, et al., 1980).

A significantly low positive correlation was found between Resistance/Susceptibility and belief in internal health locus of

control. This finding indicates that patients who perceived they were susceptible to poor health in the future, believed they were not in control of their health. This result confirms Kirscht (1972) who found that healthy university employees who perceived themselves less vulnerable to ill health believed they were in control of health. Perhaps because of past successful attempts at controlling some aspects of their health, the chronically ill persons in the present study perceived themselves able to influence future health. It may be that these patients have not achieved a state of "learned helplessness" (Suls & Mullen, 1981; Fuller, 1978; Corah & Boffa, 1970; Phares, 1971; Hiroto, 1974; Gatchel, McKinney & Koebernick, 1977).

It was surprising to find no significant relationship between socioeconomic status and belief in internal control of health. The literature supports the association of high socioeconomic status and belief in internal control (Franklin, 1963; Hunter, et al., 1980). Perhaps socioeconomic status in conjunction with other demographic and illness-related factors is related to belief in one's own actions controlling health.

Powerful Others Health Locus of Control

No significant correlations between Powerful Others Health Locus of Control and the other characteristics of the sample were found in this study. This is surprising and contrasts with the literature which supports a relationsip between extenality and age, ethnicity, socioeconomic status, unemployment, length of illness,

memory, cardiovascular disease and end-stage renal disease. One explanation for the lack of relationships between the variables and belief in powerful others controlling health is the relative generality of the Multidimensional Health Locus of Control Scale. Perhaps disease-specific health locus of control scales could more successfully tap the beliefs of cardiac and renal patients in powerful others controlling health. Other explanations for the present finding are possible. There may be limitations in the MHLC scale. Also, there may be other dimensions within the construct of powerful others health locus of control.

Chance Health Locus of Control

The specific demographic characteristics related to belief in chance health locus of control were ethnicity, marital status, level of education, socioeconomic status, and digit span. Thus, patients who were white, married, inattentive, of low socioeconomic and educational status were likely to believe that health outcomes are controlled by fate. It was surprising to find such a large number of characteristics associated with belief in chance.

The low positive correlation between ethnicity and chance health locus of control is in contrast to reports in the literature of greater belief in extenality among non-whites (Lefcourt, 1976; Battle & Rotter, 1963; Lefcourt & Ladwig, 1965). However, in the present study, 90% of the sample were white which makes the

finding somewhat suspect.

A low positive correlation was found between marital status and belief in chance controlling health. This finding may indicate a passive role of these patients not only in health but also their marital relationships. In the present study it was more surprising to find marital status and belief in powerful others controlling health were not related. Dependence on others such as a spouse would be a logical outcome for chronically ill persons as debilitation progresses. However, dependence on others may vary depending on individual situational factors.

A low negative correlation was found between education and socioeconomic status and chance health locus of control. These findings indicate that the lower the socioeconomic status or level of education, the greater belief in chance controlling the health outcome. The relationship between socioeconomic status and belief in external control is consistent with the literature (Franklin, 1963; Hunter, et al., 1980). It was surprising to find the relationship between education and locus of control since reports in the literature documenting a relationship are lacking (Wallston, Wallston & DeVellis, 1978; Levenson, 1973). But since restriction in education often results in low socioeconomic status, the finding in the present study seems logical. It is more surprising that employment status did not significantly correlate with belief in chance. The proportion of missing data may in part explain this result.

Digit span was significantly and negatively related to chance

health locus of control. This indicates that as the ability to remember or remain alert decreased, belief in fate controlled health outcomes increased. This is consistent with the association of belief in external locus of control and the tendency to forget in a study by Hunter, et al., (1980). It is possible that these chronically ill patients with poor recent memory are unable to recall successful attempts at controlling their health. Another explanation is that since they may experience deficits in cognitive functioning, they may give up on attempts to control health outcomes. Although digit span and associate learning were significantly positively related, it was surprising to find a nonsignificant relationship between chance health locus of control and this other measure of cognitive functioning.

Significant low positive correlations of Health Worry/Concern and Rejection of the Sick Role with chance Health Locus of Control are presented in the correlation matrix. These findings indicate that the individuals who were worried about their health believed in fate controlling health outcomes. Also, patients who resisted illness interfering with their lives believed health outcomes were controlled by chance. One explanation for this finding is that these patients in the present study are defensive externals, believing in internal control but endorsing the external orientation (Phares, 1978). In attributing their illness to chance, defensive externals avoid the threat they could otherwise experience when faced with failure to remain healthy(Chang, 1979). Thus, as defensive externals

who are worried about their future health but resist letting illness interfere with their lives, patients in the present study endorse belief in chance controlling health outcomes.

In summary, patients in the present study who were younger or had a shorter length of illness tended to believe in internal health locus of control. These same patients perceived their current health as favorable and believed themselves susceptible to poor health in the future. Despite these perceptions, the patients who believed in internal locus of control of health tended to resist letting illness interfere with their lives. A higher belief in chance was found among patients in the present study who were white, married, inattentive, of low socioeconomic status, or of low educational level. These patients were worried about their health and tended to resist letting illness interfere with daily living.

Intercorrelations Among Health Locus of Control Scales

As presented in the correlation matrix, a low significant positive correlation between chance and powerful others health locus of control was found. Although the correlation is very low, this finding suggests that belief in powerful others and in fate controlling health outcomes are not independent dimensions of the construct externality. Wallston and Wallston (1978) reported almost identical findings. Although using a different multidimensional health locus of control scale, Lau and Ware found no significant correlation between Chance Health Outcomes and Provider Control Over Health scales which resemble Wallston's Chance Health and Powerful Others Health Locus of

Control scales. However, Lau and Ware (1981) did report a significantly positive relationship between Chance Health Events and General Health Threat, two "external" scales. According to these researchers, General Threat to Health scale taps the belief that doctors (powerful others) are unable to diagnose health threats. Thus, this belief within the Wallston's scale might account for the intercorrelation in the present study of Chance Health with Powerful Others Health Locus of Control scale.

A low significant positive correlation between internal and powerful others health locus of control was found in the present study. This finding is in contrast to that of Wallston, Wallston and Devellis (1978) who reported a nonsignificant correlation between these scales. However, the finding in the present study is in agreement with the study by Lau and Ware (1981). Utilizing the newly devised four dimensional health locus of control scale, these researchers found a statistically significant positive correlation between belief in provider control and self-control of health. According to Lau and Ware (1981), persons who believed that health outcomes could be controlled tended to believe both in themselves and in the ability of powerful others to determine health outcomes. The contention of Lau and Ware (1981) appears to be consistent with findings in the present study.

Results of a Stepwise Multiple Regression Analysis

To assess the relative contributions of the predictor variables to health locus of control beliefs, a stepwise multiple regression was performed. Eleven predictor variables were entered into three

separate regression analyses. Based on the relatedness of predictors to the criterion variables, specific predictor variables were chosen for the regression analysis. These variables included: diagnostic category, age, sex, marital status, ethnicity, level of education, length of illness, length of hospitalization, digit span, associate learning, and current health perception.

In the first regression analysis, the eleven predictor variables were entered to determine the effect on Internal Health Locus of Control. As presented in Table 7, the first variable to emerge was Current Health which accounted for 6.4% of the variance. Length of illness emerged next in the regression and accounted for 3.6% of the variance in internal health locus of control. Current Health and length of illness together accounted for 10% of the variance in internal control of health. Age did not emerge as a significant variable probably due to its interrelatedness with length of illness.

A second regression analysis was performed to determine the effect of the eleven predictor variables on Powerful Others Health Locus of Control. No variables emerged which were statistically significant. Considering that no variables were related to powerful others health locus of control, the results of this regression were expected.

A third regression was performed to determine the effect of the eleven predictor variables on Chance Health Locus of Control. Education

Table 7

Results of a Stepwise Multiple Regression of Eleven Variables in Relation to Health Locus of Control

HLC	Multiple Correlation	Cumulative Variance	F Value
Internal			
Current Health	.25	.06	8.42*
Length of Illness	.32	.10	4.93*
Powerful Others			
Current Health	-.14	.02	2.53
Chance			
Education	-.29	.08	11.26*
Ethnicity	.33	.11	3.82*

*$p < .05$

was the first variable to emerge and accounted for 8.4% of the variance. As indicated in Table 7, ethnicity emerged as the second variable contributing 2.8% of the variance in belief in chance health locus of control. Accounting for a total of 11.2% of the variance, education and ethnicity were the only variables significantly contributing to Chance Health Locus of Control. Digit span and marital status did not emerge as significant variables. This can be explained by the interrelatedness of these variables with education as displayed in the correlation matrix.

In summary, many factors which appeared to be related to health locus of control beliefs did not emerge from the regression analysis. Several explanations for this result are possible. First, there may be limitations in the instruments used. Second, reinforcement value, a major determinant of behavior potential, was not measured in this study. According to social learning theory, locus of control beliefs are irrelevant predictors in behavior in individuals who do not value the outcome (Rotter, 1966). In the present study, it was assumed that the patients valued health as an outcome but it was not measured. Thus, this methodological weakness might explain the lack of findings. Finally, it may be that belief in powerful others, chance, or oneself varies according to the interaction of situational factors. For example, it may be beneficial to believe in powerful others controlling health in certain instances. However, in the lives of these chronically ill patients, the full range of situational factors that influenced locus of control beliefs was not known.

CHAPTER IV

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

Locus of control has been recognized as a major variable associated with behavioral outcomes in health. Yet, little research has dealt with the effect of chronic illness on locus of control beliefs. Even fewer investigations have identified the influence of individual characteristics which contribute to varied beliefs about control of health. The present research focused on variations in health locus of control beliefs in relation to selected demographic and illness-related characteristics among cardiovascular disease and end-stage renal disease patients.

The subjects in this study included 64 cardiovascular disease and 61 end-stage renal disease patients between the ages of 19 to 78. A majority of the patients were white, married, unemployed, of average education, and low socioeconomic status. The sample was comparable to normal subjects in aspects of cognitive functioning. Experiencing a lengthy term of illness and recovering from a longer than average period of hospitalization, these patients perceived their present health as unfavorable, were worried about future health, and assessed themselves susceptible to further illness. Despite these perceptions, this group of chronically ill persons were striving to not let illness interfere with their lives. All demographic and illness-related data were collected by means of an interview and a self-administered questionnaire.

Patients in this sample expressed a moderate belief in internal, powerful others, and chance factors controlling health outcomes. Compared to younger and healthier persons, patients in the present study exhibited greater belief in powerful others and chance influencing health. However, no significant relationships were found between belief in powerful others and patient characteristics in this study.

Patients who were younger or who had a shorter length of illness tended to hold a belief in internal health locus of control. These patients perceived their current health as favorable but assessed themselves susceptible to poor health in the future. Such patients also reported striving to live their lives despite their illness.

Patients who were white, married, inattentive, of low socioeconomic status, or less education believed in chance controlling their health. Also, these patients were worried about their health but reported a tendency to resist letting illness interfere with daily life.

In the stepwise multiple regression analysis, eleven predictor variables were assessed for their relative importance in influencing the criterion variable, the three beliefs in health locus of control. Perception of current health and length of illness emerged in order of importance accounting for the variance of internal health locus of control. No variables significantly affected belief in powerful others, the second criterion variable. The two variables having the greatest effect on chance health locus of control, in order of importance, were education and ethnicity.

Conclusions

Findings in the present study indicate that when considered together perception of current health status and length of illness predict greater belief in internal health locus of control. While current health perception was identified as most influential on belief in one's own actions controlling health, this variable explained a small proportion of the variance. Thus, a majority of specific factors that contribute to an internal health locus of control are unknown. For cardiac and renal patients in the present study, none of the specific demographic or illness-related factors were important to belief in powerful others controlling health. Education and ethnicity predicted greater belief in chance health locus of control. Although education emerged as most predictive of belief in chance factors controlling health, this factor accounted for only 8% of the variance. Additional factors contributing to a belief in chance locus of control remain unidentified.

The results of this research reflect the complex nature of health beliefs in chronic illness. In cardiovascular disease and end-stage renal disease, the full scope of social, cognitive, psychological, and health-related factors which influence belief in responsibility for health are unknown. A broader understanding of these influences is essential for nurses planning healthcare programs for these patients.

In attempting to achieve positive health outcomes for chronically ill patients, nurses may choose to match health locus of control

beliefs to guide in the selection of appropriate nursing interventions. On the other hand, if altering beliefs in control of health is productive in achieving positive health outcomes, nurses must know which factors influencing health locus of control beliefs are modifiable. Nursing actions can then be directed at modifying these factors which are detrimental to belief in control of health and positive health outcomes. The present study provides beginning research in the identification of factors influencing health locus of control beliefs.

The results of the present study further indicate that chronically ill persons differ in beliefs but are similar in some aspects to healthy persons. Despite limitations imposed by chronic illness, patients continue to maintain an average level of cognitive functioning and strive for "normal" lives. Thus, it seems important for nurses, who spend a great deal of time with such chronically ill individuals, to realize these strengths. Nurses might utilize these strengths when collaborating with patients to achieve a more optimal adjustment to their illness.

Recommendations

The results of the present study suggest a number of recommendations for future research in health locus of control beliefs of chronically ill patients. First, a longitudinal study of patients with cardiovascular disease and end-stage renal disease would provide evidence for changes in health locus of control beliefs as chronic illness progresses. Second, as education was important to belief in

chance controlling health, further analysis of the role of educational experiences influencing health attitudes is recommended. Third, as none of the demographic or illness-related factors contributed to an understanding of belief in powerful others controlling health, further study is advised to determine the dimensions of this construct. Testing cardiac and renal patients with disease specific health locus of control scales may contribute to a clearer understanding of belief in powerful others in these populations. In light of Lau and Ware's (1981) four dimensional health locus of control scale, comprised of three dimensions of externality, future study of locus of control beliefs in health is needed with these newly-devised scales. Fourth, clinical studies are recommended that examine health locus of control beliefs among cardiovascular disease patients and end-stage renal disease patients as separate chronic illness populations. Analyzing these populations separately might result in ability to account for greater variance in health locus of control beliefs. Finally, further study of other factors influencing health locus of control beliefs is needed. These factors may include the reinforcement value of health, the effect of attitudes and behaviors of health professionals on patient health attitudes, and the effect of previous health behaviors on health locus of control beliefs.

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Appendix A

Patient Profile Questionnaire

Patient Profile Questionnaire

Hospital Interview Schedule

Indentification Number_____ Diagnosis: Primary_____

Secondary_____

Trait Number	Variable
1	Date of Birth_____ Age (at last birthday)_____ _____
2	Sex: Male_____ Female_____
3	Present marital status (circle one) 1. Married: living with spouse 2. Married: not living with spouse 3. Divorced or legally separated 4. Widowed 5. Never married 6. Other (cohabitation)_____
4	Ethnic group (circle one) 1. Caucasian 2. Black 3. Mexican-American 4. American Indian 5. Other (identify)_____
5	Highest grade of school completed (circle one) 1 2 3 4 5 6 7 8 9 10 11 12* College: 13 14 15 16* Postgraduate: 17+ Highest degree attained:*_____ *If 10-12 are circled, note if high school graduate If 13-16 are circled, note if any type of degree was awarded (such as Associate degree/Baccalaureate)
6	Occupation-Employment Status A. Please classify the patient's usual occupation (circle one) 1. Professional 2. Manager or owner of business 3. Farmer (owner or manager of at least 100 acres) 4. Clerical, sales, technician 5. Skilled craftsman, foreman 6. Operative, semi-skilled 7. Service worker 8. Unskilled 9. Farm labor (owner of less than 100 acres) 10. Housewife

ID#_____

B. Probes to be used to correctly classify work (add other information the patient may give). Ask patient.
   1. What is the title of your position?_____
   2. State the general duties of the job._____
   3. What is the name of the company?_____
   4. What is the approximate size of the company?_____
      (Number of employees)

C. Employment status: (circle one and write in)
   1. Employed (employed before illness and plans to return)
      Full time_____
      Part time_____ Hours per week_____
   2. Unemployed_____
   3. Unemployed and looking for work_____
   4. Retired_____ How long?_____

D. How important is it to you or your family for you to be gainfully employed? (circle one)
   1. Critical
   2. Very important
   3. Important
   4. Not important

E. (If patient was housewife before illness) Did you manage household tasks? (circle one)
   1. Most of household tasks
   2. Only some of household tasks
   3. None of household tasks

F. Ask patient to try to estimate his/her total income (including spouse's income, if any) from all sources for the past 12 months. (circle one)

1. $50,000 or more	10. $5,000 to $5,999
2. $25,000 to $49,999	11. $4,000 to $4,999
3. $15,000 to $24,999	12. $3,500 to $3,999
4. $12,000 to $14,999	13. $3,000 to $3,499
5. $10,000 to $11,999	14. $2,500 to $2,999
6. $ 9,000 to $ 9,999	15. $2,000 to $2,499
7. $ 8,000 to $ 8,999	16. $1,500 to $1,999
8. $ 7,000 to $ 7,999	17. $1,000 to $1,499
9. $ 6,000 to $ 6,999	18. Less than $1,000

7. Living arrangements
   A. Do you live alone? 1. Yes_____ 2. No_____
   B. Do you have anyone who will be concerned about your following the medical regimen? (circle one)
      1. Yes 2. Probably Yes 3. Probably No 4. No 5. I don't know.

ID #_____

C. Will some other person (besides yourself) be involved in helping you follow the medical regimen? (within the next 3 months)
1. Yes - considerably
2. Yes - to some extent
3. No - probably not
4. No
5. I don't know

Probe to C if 1 or 2 is circled:
With what aspects of the medical regimen will the other person be involved? (circle all that apply)
1. Diet
2. Medication
3. Exercise
4. Physical care (bathing)
5. Other_____

8. Payment for health care
A. Who will pay for your prescribed medications when you leave the hospital?

1. Patient pays in full
2. Patient pays in part (including insurance coverage)
3. Another Source pays (i.e., individual, governmental/private agency/insurance)
4. Don't know.

A. Does the patient consider medication as expensive?
1. Yes
2. No

a. Will it be:
1. Not a problem.
2. A problem, but will manage
3. A problem and will have to consider if they are worth the expense
4. A problem and not able or willing to buy them
5. Don't know.

B. Do you believe that your financial resources are adequate to cover the cost of your health care? (circle one)
1. Yes (adequate)
2. No (inadequate)

C. Do you believe that your financial resources are adequate to cover living expenses during recovery period? (circle one)
1. Yes (adequate)
2. No (inadequate)

ID#_____

9. Length of Illness (as defined by the patient)
   A. The date when you were aware of having symptoms of poor health (i.e., aware of having a health problem).
      Write in the approximate date_____

   B. The date when you made changes in living routine because of symptoms.
      Write in the approximate date_____

   C. What changes in your living routine were made? (Circle one)
      1. In dietary routine
      2. In rest-sleep patterns
      3. In taking medications
      4. In frequent visits to doctor
      5. Other_____
         Explain_____
         _____

   D. Interviewer calculates length of illness

      Number of days_____, weeks_____, months_____

10. Length of time of treatment at present hospital

    Interviewer calculates this
    Number of days_____, weeks_____, months_____

Appendix B

Wechsler Memory Scale

(Wechsler, 1945)

ID#_____

Memory Scales

Memory Scales includes two tests (1) Digit Span and (2) Associate Learning. These tests are administered orally to the subject - the subject does not see the contents of these pages. Administer the texts exactly as directed.

1. DIGIT SPAN

(a) Digits Forward

Directions: Start with Trial I of Series 3 for all subjects. Begin by saying, "I am going to say some numbers. Listen carefully, and when I am through, say them after me."

In any series, if the subject repeats Trial I correctly, proceed to the next higher series. If the subject fails Trial I, give Trial II of the same series, then proceed to the next series if he passes. The second trial of a series is given only if the first trial is failed.

Discontinue; After failture on both trials of a given series.

Scoring: The score is the number of digits in the longest series repeated without error in Trial I or II -- Circle that number in the right-hand column.

Series	Trial I	Trial II	Score
(3)	5-8-2	6-9-4	3
(4)	6-4-3-9	7-2-8-6	4
(5)	4-2-7-3-1	7-5-8-3-6	5
(6)	6-1-9-4-7-3	3-9-2-4-8-7	6
(7)	5-9-1-7-4-2-8	4-1-7-9-3-8-6	7
(8)	5-8-1-9-2-6-4-7	3-8-2-9-5-1-7-4	8
(9)	2-7-5-8-6-2-5-8-4	7-1-3-9-4-2-5-6-8	9

(b) Digits Backward

Directions: Introduce this test by saying, "Now I am going to say some more numbers, but this time when I stop I want you to say them backwards. For example, if I say "7-1-9" what would you say?"

ID#_____

If the subject responds correctly, say "Here are some others" and proceed with the test beginning with Trial I of the 3-digit Series.

If the subject does not reply correctly or fails to understand, give the right answer and another example, saying "Remember, you are to say them backwards: 3-4-8." If the subject succeeds this time, proceed with the test using Trial I of the 3-digit Series. However, if he fails the second example, proceed with the test by giving Trial I of the 2-digit Series. If a subject passes an example but fails both of the 3-digit Series, go back and give the 2-digit Series, then discontinue the test.

Discontinue: After failure on both trials of a given series.

Scoring: The score is the number of digits in the longest series repeated backwards without error in Trial I or II. - Circle that number in the right-hand column.

Series	Trial I	Trial II	Score
(2)	2-4	5-8	2
(3)	6-2-9	4-1-5	3
(4)	3-2-7-9	4-9-6-8	4
(5)	1-5-2-8-6	6-1-8-4-3	5
(6)	5-3-9-4-1-8	7-2-4-8-5-6	6
(7)	8-1-2-9-3-6-5	4-7-3-9-1-2-8	7
(8)	9-4-3-7-6-2-5-8	7-2-8-1-9-6-5-3	8

To calculate total score on Digit Span: Add the score for (a) and (b)

Digits Forward = _____

Digits Backward = _____

Total DIGIT SPAN SCORE = _____

Total score must be 8 or more in order for patient to be included in this study.

ID#_____

2. ASSOCIATE LEARNING

Say, "I am going to read to you a list of words, 2 at a time. Listen carefully because after I am through I shall expect you to remember the words that go together. For example, if the words were EAST-WEST; GOLD-SILVER; then when I say the word EAST, I would expect you to answer (pause) WEST. And when I said the word GOLD, you would, of course answer (pause) SILVER. Do you understand?"

When patient is clear as to directions, continue as follows: "Now listen carefully to the list as I read it." Read first presentation--METAL-IRON, BABY-CRIES, etc. at the rate of 1 pair every 2 seconds.

First Presentation

Metal - Iron
Baby - Cries
Crush - Dark
North - South
School - Grocery
Rose - Flower
Up - Down
Obey - Inch
Fruit - Apple
Cabbage - Pen

After reading the first presentation, allow 5 seconds and test by presenting first recall list. Give first word of pair and allow a maximum of 5 seconds for response. If patient gives correct reply, say, "That's right, " and proceed with the next pair. If patient gives incorrect reply, say, "No", supply the correct association, and proceed with the following words.

First Recall	(Answers for Tester)* + = correct response 0 = incorrect response	SCORE (Correct Items=+)
North	(South) _____	0.5 _____
Fruit	(Apple) _____	0.5 _____
Obey	(Inch) _____	1.0 _____
Rose	(Flower) _____	0.5 _____
Baby	(Cries) _____	0.5 _____
Up	(Down) _____	0.5 _____
Cabbage	(Pen) _____	1.0 _____

ID#_____

Metal	(Iron)	_____	0.5_____
School	(Grocery)	_____	1.0_____
Crush	(Dark)	_____	1.0_____

*Give credit only if subject gives correct response within 5 seconds.

First Recall Score _____

After the first recall has been completed, allow a 10-second interval and give second presentation list, proceeding as before.

Second Presentation	Second Recall	(Answers for Tester)* + = correct response 0 = incorrect response	SCORE + = Correct Items
Rose-Flower			
Obey - Inch			
North-South	Cabbage	(Pen) _____	1.0_____
Cabbage - Pen			
Up - Down	Baby	(Cries) _____	0.5_____
Fruit - Apple			
School - Grocery	Metal	(Iron) _____	0.5_____
Metal - Iron			
Crush - Dark	School	(Grocery) _____	1.0_____
Baby - Cries			
	Up	(Down) _____	0.5_____
	Rose	(Flower) _____	0.5_____
	Obey	(Inch) _____	1.0_____
	Fruit	(Apple) _____	0.5_____
	Crush	(Dark) _____	1.0_____
	North	(South) _____	0.5_____

Second Recall Score _____

Third Presentation	Third Recall		
Baby - Cries	Obey	(Inch) _____	1.0_____
Obey - Inch			
North - South	Fruit	(Apple) _____	0.5_____
School - Grocery			
Rose - Flower	Baby	(Cries) _____	0.5_____
Cabbage - Pen			
UP - Down	Metal	(Iron) _____	0.5_____
Fruit - Apple			
Crush - Dark	Crush	(Dark) _____	1.0_____
Metal - Iron			

ID#_____

School	(Grocery)	_____	1.0_____
Rose	(Flower)	_____	0.5_____
North	(South)	_____	0.5_____
Cabbage	(Pen)	_____	1.0_____
Up	(Down)	_____	0.5_____

Third Recall Score _____

SCORING:

First Recall Score _____

Second Recall Score _____

Third Recall Score _____

TOTAL _____

Total score must be 8 or more in order for patient to be included in this study.

Appendix C

Health Perceptions Questionnaire

(Ware, 1976)

ID#_____

Health Perceptions

Please read each of the following statements, and then circle one of the numbers on each line to indicate whether the statement is true or false for you.

There are no right or wrong answers.

If a statement is definitely true for you, circle 5.
If it is mostly true for you, circle 4.
If you don't know whether it is true or false, circle 3.
If it is mostly false for you, circle 2.
If it is definitely false for you, circle 1.

Some of the statements may look or seem like others, but each statement is different and should be rated by itself.

	Definitely True	Mostly True	Don't Know	Mostly False	Definitely False
A. According to the doctors I've seen, my health is now excellent	5	4	3	2	1
B. I try to avoid letting illness interfere with my life.	5	4	3	2	1
C. I seem to get sick a little easier than other people.	5	4	3	2	1
D. I feel better now than I ever have before.	5	4	3	2	1
E. I will probably be sick a lot in the future.	5	4	3	2	1
F. I never worry about my health.	5	4	3	2	1
G. Most people get sick a little easier than I do.	5	4	3	2	1
H. I don't like to go to the doctor.	5	4	3	2	1
I. I am somewhat ill.	5	4	3	2	1
J. In the future, I expect to have better health than other people I know.	5	4	3	2	1

ID#_____

	Definitely True	Mostly True	Don't Know	Mostly False	Definitely False
K. I was so sick once I thought I might die.	5	4	3	2	1
L. I'm not as healthy now as I used to be.	5	4	3	2	1
M. I worry about my health more than other people worry about their health.	5	4	3	2	1
N. When I'm sick ,I try to just keep going as usual.	5	4	3	2	1
O. My body seems to resist illness very well.	5	4	3	2	1
P. Getting sick once in a while is part of my life.	5	4	3	2	1
Q. I'm as healthy as anybody I know.	5	4	3	2	1
R. I think my health will be worse in the future than it is now.	5	4	3	2	1
S. I've never had an illness that lasted a long period of time.	5	4	3	2	1
T. Others seem more concerned about their health than I am about mine.	5	4	3	2	1
U. When I'm sick, I try to keep it to myself.	5	4	3	2	1
V. My health is excellent.	5	4	3	2	1
W. I expect to have a very healthy life.	5	4	3	2	1
X. My health is a concern in my life.	5	4	3	2	1
Y. I accept that sometimes I'm just going to be sick.	5	4	3	2	1
Z. I have been feeling bad lately.	5	4	3	2	1
AA. It doesn't bother me to go to the doctor.	5	4	3	2	1

ID#_____

		Definitely True	Mostly True	Don't Know	Mostly False	Definitely False
BB.	I have never been seriously ill.	5	4	3	2	1
CC.	When there is something going around, I usually catch it.	5	4	3	2	1
DD.	Doctors say I am now in poor health.	5	4	3	2	1
EE.	When I think I am getting sick, I fight it.	5	4	3	2	1
FF.	I feel about as good now as I ever have.	5	4	3	2	1

Appendix D

Multidimensional Health Locus of Control Scale

(Wallston, Wallston & DeVellis, 1978)

Form A ID#_____

Multidimensional Health Locus of Control

(MHLC)

This is a questionnaire designed to determine the way in which different people view certain important health-related issues. Each item is a belief statement with which you may agree or disagree. Beside each statement is a scale which ranges from strongly disagree (1) to strongly agree (6). For each item we would like you to circle the number that represents the extent to which you disagree or agree with the statement. The more strongly you agree with a statement, then the higher will be the number you circle. The more strongly you disagree with the statement, then the lower will be the number you circle. Please make sure that you answer every item and that you circle only one number per item. This is a measure of your personal beliefs; obviously, there are no right or wrong answers.

Please answer these items carefully, but do not spend too much time on any one item. As much as you can, try to respond to each item independently. When making your choice, do not be influenced by your previous choices. It is important that you respond according to your actual beliefs and not according to how you feel you should believe or how you think we want you to believe.

Strongly Disagree	- 1
Moderately Disagree	- 2
Slightly Disagree	- 3
Slightly Agree	- 4
Moderately Agree	- 5
Strongly Agree	- 6

1.	If I get sick, it is my own behavior which determines how soon I get well again	1	2	3	4	5	6
2.	No matter what I do, if I am going to get sick, I will get sick.	1	2	3	4	5	6
3.	Having regular contact with my physician is the best way for me to avoid illness.	1	2	3	4	5	6
4.	Most things that affect my health happen to me by accident.	1	2	3	4	5	6
5.	Whenever I don't feel well, I should consult a medically trained professional.	1	2	3	4	5	6
6.	I am in control of my health.	1	2	3	4	5	6

ID#_____

7.	My family has a lot to do with my becoming sick or staying health.	1	2	3	4	5	6
8.	When I get sick, I am to blame.	1	2	3	4	5	6
9.	Luck plays a big part in determining how soon I will recover from an illness.	1	2	3	4	5	6
10.	Health professionals control my health.	1	2	3	4	5	6
11.	My good health is largely a matter of good fortune.	1	2	3	4	5	6
12.	The main thing which affects my health is what I myself do.	1	2	3	4	5	6
13.	If I take care of myself, I can avoid illness.	1	2	3	4	5	6
14.	When I recover from an illness, it's usually because other people (for example, doctors, nurses, family, friends) have been taking good care of me.	1	2	3	4	5	6
15.	No matter what I do, I'm likely to get sick.	1	2	3	4	5	6
16.	If it's meant to be, I will stay healthy.	1	2	3	4	5	6
17.	If I take the right actions, I can stay healthy.	1	2	3	4	5	6
18.	Regarding my health, I can only do what my doctor tells me to do.	1	2	3	4	5	6

Appendix E

Consent Form for Human Research

ID#_____

CONSENT FOR HUMAN RESEARCH PROJECT

I, _____
(First Name) (Middle Initial) (Last Name)

herewith agree to serve as subject in the investigation named Patient Teaching: A Trait-Treatment Interaction Strategy, under the supervision of Dr. May Rawlinson and M. Katherine Crabtree, R.N., A.N.P. and Betty Langlow, R.N., H.N. The investigation aims at finding the best way to teach particular types of patients about their self-administered prescribed medications.

It is my understanding that I will participate in a planned, systematic teaching method to learn more about the medications the doctor has ordered in my treatment. I will be required to answer some questions during an interview and to complete paper and pencil tests. The questions relate to my knowledge of and practice in taking prescribed medications. The paper and pencil tests are commonly used personality tests. The time required for my participation will not exceed one hour a day for four consecutive days prior to discharge from the hospital. After I have returned home, I will be visited by one of the research workers for an interview that will take about one hour.

All information that I give will be handled confidentially. My anonymity will be maintained on all documents, which will be identified by means of code numbers.

I may benefit from these procedures by knowing more about the medications that the doctor has ordered for me to take when I leave the hospital.

Judi Gorsuch, R.N., B.A. and Barbara McNeil, R.N., B.S. have offered to answer any questions I might have about the procedures I am submitting to.

I understand it is not the policy of the Department of Health and Human Services or any other agency funding the research project in which I am participating to compensate or provide medical treatment for human subjects in the event the research results in physical injury. I further understand that should I suffer any injury from the research project, compensation would be available only if I established that the injury occurred through the fault of the hospital, its officers, or employees or my physician. I understand that further information regarding this policy may be obtained from Dr. Donald Rushmer, Director of Research, at 229-7219.

I understand that I am free not to participate or to withdraw from participation in the investigation at any time without this decision otherwise affecting my relationship with or medical treatment in the hospital.

ID#_____

I have read the above explanation and agree to participate as a patient in the study described.

Signature:_____

Witness:_____

Date:_____

5/11/81

AN ABSTRACT OF THE THESIS BY

Barbara J. McNeil

For the Master of Nursing

Date of receiving this degree: June 11, 1982

Title: A STUDY OF SELECTED VARIABLES ASSOCIATED WITH MULTI-DIMENSIONAL HEALTH LOCUS OF CONTROL AMONG CARDIOVASCULAR DISEASE AND END-STAGE RENAL DISEASE PATIENTS

Approved: [redacted] Thesis Advisor

The present research focused on variations in health locus of control beliefs in relation to selected demographic and illness-related characteristics among cardiovascular disease and end-stage renal disease patients. The subjects in this study included 64 cardiovascular disease and 61 end-stage renal disease patients between the ages of 19 to 78.

A majority of the patients were white, married, unemployed, of average education, and low socioeconomic status. The sample was comparable to normal subjects in aspects of cognitive functioning. Experiencing a length term of illness and recovering from a longer than average period of hospitalization, these patients perceived their present health as unfavorable, were worried about future health, and assessed themselves susceptible to future illness. Despite these perceptions, this group of chronically ill persons were striving to

not let illness interfere with their lives. All demographic and illness-related data were collected by means of an interview and a self-administered questionnaire.

When compared to a group of middle-aged adults in a non-health related setting, patients in the present study were no different in belief in internal health locus of control. However, patients in the present study exhibited significantly greater belief in powerful others and chance influencing health.

Patients who were younger or who had a shorter length of illness tended to hold a belief in internal health locus of control. These patients perceived their current health as favorable but assessed themselves susceptible to poor health in the future. Such patients also reported striving to live their lives despite their illness.

No significant correlations were found between belief in powerful others and patient characteristics in this study. However, patients who were white, married, inattentive, of low socio-economic status, or less education believed in chance controlling their health. Also, these patients were worried about their health but reported a tendency to resist letting illness interfere with daily life.

In the stepwise multiple regression analysis, eleven predictor variables were assessed for their relative importance in influencing the criterion variables, the three beliefs in health locus of control. Perception of current health and length of illness were the

two best predictors of internal health locus of control, accounting for 10% of the variance. No variables significantly affected belief in powerful others, the second criterion variable. The two variables having the greatest effect on chance health locus of control, in order of importance, were education and ethnicity, accounting for 11.2% of the variance.

The results of this research reflect the complex nature of health beliefs in chronic illness. In cardiovascular disease and end-stage renal disease, the full scope of social, cognitive, psychological, and health-related factors which influence belief in responsibility for health are unknown. Further research is needed to acquire a broader understanding of these influences. Recommendations for future research were offered.